Wyckoff Eagle Harbor Site

EPA United States Environmental Protection Agency

DEPARTMENT OF ECOLOGY State of Washington

Community Interest Group Meeting

November 13, 2014

Meeting Agenda

Welcome, Remembrance, Agenda Review

Status update on Site Management
- Ecology presentation
- Discussion and informal input from CIG members

Alternatives Under Evaluation – EPA presentation
- Upland and Beach Alternatives
- Evaluation Approach
- Coordination between Upland and Beach remedies
- Revised Schedule

Questions and informal input from audience members

Next Steps, Upcoming Meetings
- Community Interest Group Meeting #5 ?
- EPA informal public meeting #2 – December 10, 2014

Status update on Site Management

- Groundwater Treatment Plant re-started November 3rd
- Deep Aquifer sampling conducted October 22 and 23 (? – confirm dates)

Wyckoff Groundwater Extraction Treatment System

Summer Shutdown Summary

- Initial Planned Shutdown Schedule – April 1, 2014 to September 30, 2014.
- Due to heavy precipitation in April 2014, the plant remained operational through April 2014 with restart rescheduled for November 3, 2014.
- Actual Shutdown Schedule – May 1, 2014 to October 28, 2014 with the plant restarted on October 28, 2014.
- The plant was restarted a few days early due to heavy precipitation in late October.
- The plant's computer failed in early August (~ 8/7). A replacement computer was installed on August 25, 2014. No groundwater elevation data during this period.
- Due to inability to recover data from the old computer, total groundwater elevation data lost extends from mid April 2014 to August 24, 2014.

EPA's lower aquifer groundwater sampling was conducted on October 20 -22. Analytical results should be available by December or January 2015.

After CH completion of the Focused Feasibility Study, CH will complete a groundwater level evaluation for this summer shutdown period.

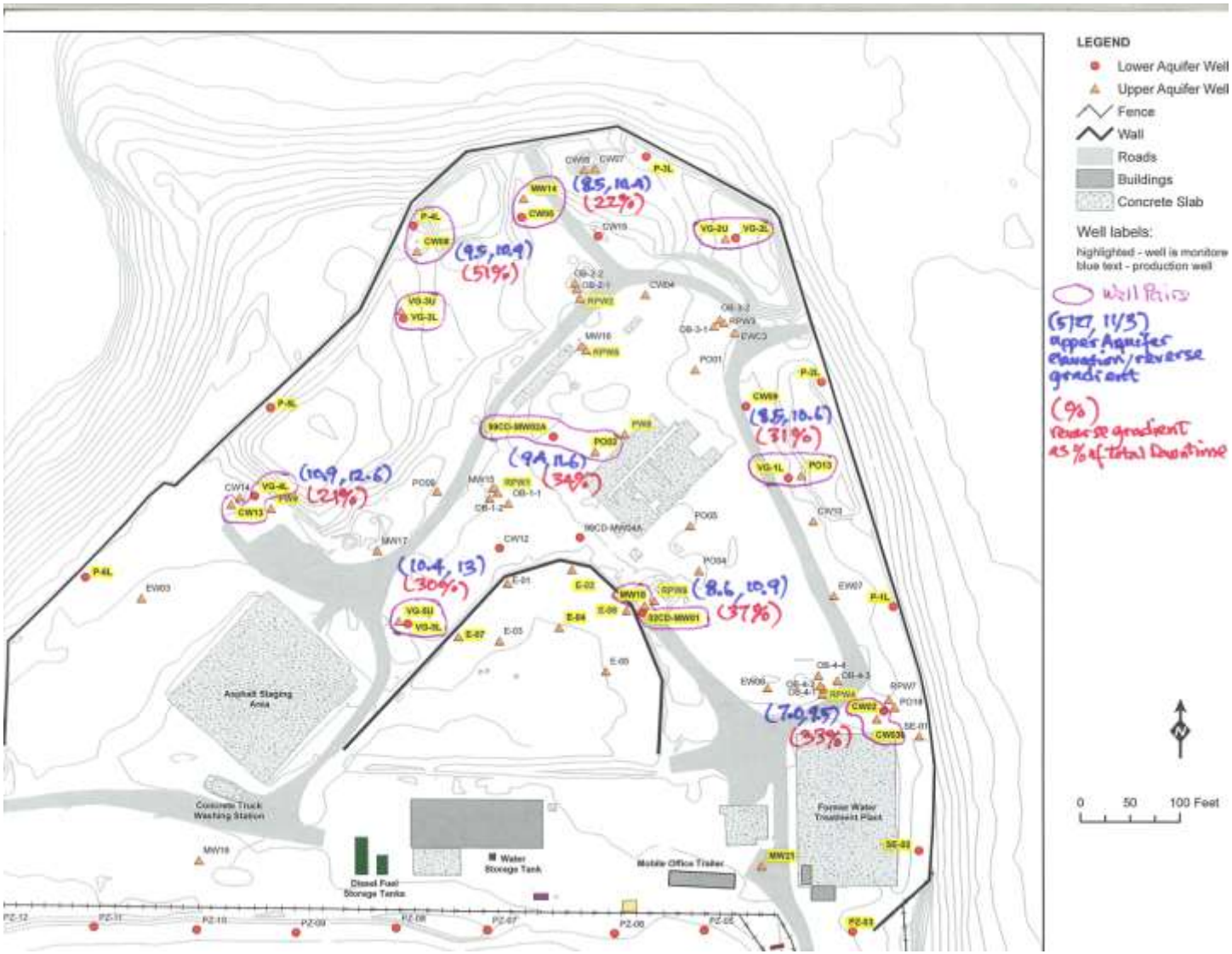
Wyckoff Groundwater Extraction Treatment System

Monthly Precipitation at Wyckoff Point

2/2014	.....	5.85 inches
3/2014	.....	8.29
4/2014	.....	1.44
5/2014	.....	3.26
6/2014	.....	0.79
7/2014	.....	1.5
8/2014	.....	0.79
9/2014	.....	1.87
10/2014	.....	5.85
11/4/2014	.....	0.54

Groundwater Extraction Treatment System

(Elevations and % gradient reversal for well pairs)



Status of Upland Cleanup Alternatives Analysis

In our last meeting, May 2014

- Described the cleanup *technologies* being considered
- Explained how alternatives are weighed to reach a cleanup decision – a.k.a. the Superfund 9 Criteria
- Will quickly review these items today

Progress since May

- Technologies combined into 7 Alternatives
- Conceptual design, construction duration and rough cost estimate for each alternative developed
- Alternatives compared to one another in Draft Focused Feasibility Study (FFS)
- Two alternatives dropped from further evaluation

Technologies Evaluated

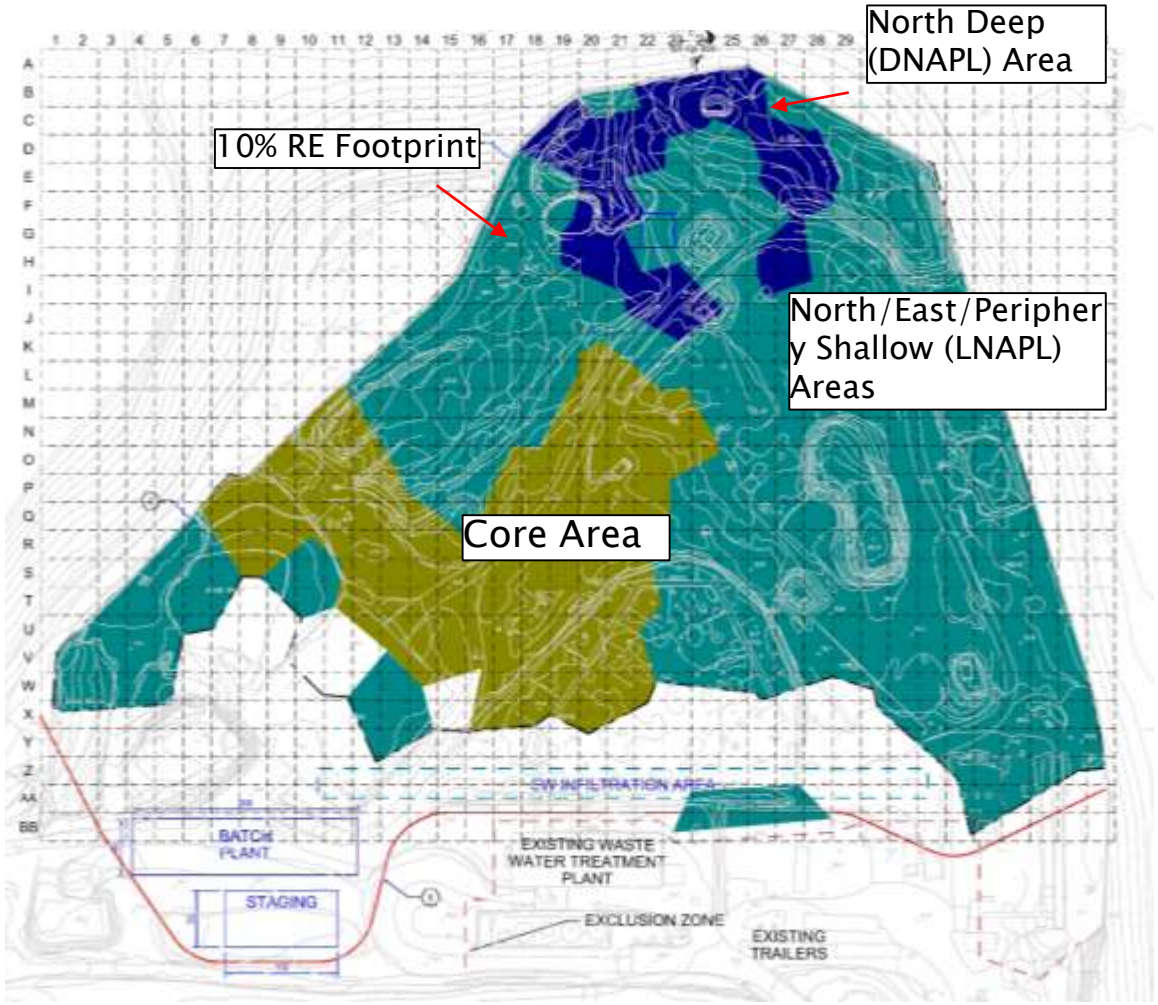
- Thermal Enhanced Extraction
  - Belowground Steam Injection
- Medium Temperature Thermal Desorption (MTTD)
  - Aboveground heating ~ 1000°F
- *In Situ* Soil Stabilization (ISS)
  - Belowground mixing with Portland cement mixture
- *In Situ* Chemical Oxidation (ISCO)
  - Belowground mixing with H_2O_2 or permanganate
- Enhanced Aerobic Biodegradation (EAB)
  - Belowground injection of air
- Passive Groundwater Treatment

Alternatives

1. No action
2. Containment (the current remedy)
3. Excavation, Thermal Desorption, and In Situ Chemical Oxidation
4. In-Situ Solidification / Stabilization
5. Thermal Enhanced Extraction and ISS
6. Shallow excavation, Thermal Desorption, and Thermal Enhanced Extraction
7. ISS of Core Area, Thermal Enhanced Extraction

NAPL Source Area Identified for Treatment

Currently includes the area within the upper aquifer defined by the10% RE – TarGOST footprint.



Alternative 1 – No Action

- Description: No additional cleanup, groundwater pumping discontinued
- Duration: 0 years
- Cost: $0

Alternative 2 – Containment

- Description: Continue current GWTP operations, upgrade recovery well system and GWTP
- Duration: 2 years active construction, 100+ years of O&M
- Cost: $70.6 million (present worth cost, base year of 2016)

Alternative 3 – Excavation, MTTD & ISCO

- Description: Excavation and thermal desorption of contaminated soils in the core area, north shallow and east shallow NAPL areas. ISCO treatment of NAPL in the north deep area and other discrete periphery areas. EAB to polish.
- Duration: ? Not developed because alternative was dropped due to implementibility and cost considerations
- Cost: $? (not developed)

Alternative 4 – ISS

- Description: ISS treatment of virtually all the mobile NAPL on site through auger mixing or jet grouting.
- Duration: 10 years – 3 years active construction
- Cost: $ 86.3 million

Alternative 5 – Thermal Enhanced Extraction with ISS and EAB

- Description: NAPL recovery through an expanded network of groundwater wells, enhanced with heat (steam injection) in the core area, north shallow and east shallow areas. ISS in the north deep area, using jet grout mixing. EAB in peripheral areas, and to "polish" treated zones
- Duration: 29 years – active construction 10 years
- Cost: $ 134.1 million

Alternative 6 – Excavation, MTTD and Thermal Enhanced Extraction

- Description: “Shallow” excavation and MTTD treatment of contaminated soil from the top 20 feet of the core area. Thermal enhanced extraction in the core area below 20 feet, and in the north shallow, east shallow, and north deep areas. EAB in periphery areas and as a “polishing” step in thermally treated areas.
- Duration: 28 years – 15 active construction
- Cost: $ 186 million

Alternative 7 – ISS in "core," with thermal enhanced recovery

- Description: ISS of the core area. NAPL recovery and EAB in other areas. Monitor progress and treat additional problem areas with "wet" steam injection and continued EAB.
- Duration: 16 years ? – 10 years active, first year very busy with ISS
- Cost: $85.2 million ?

Alternatives

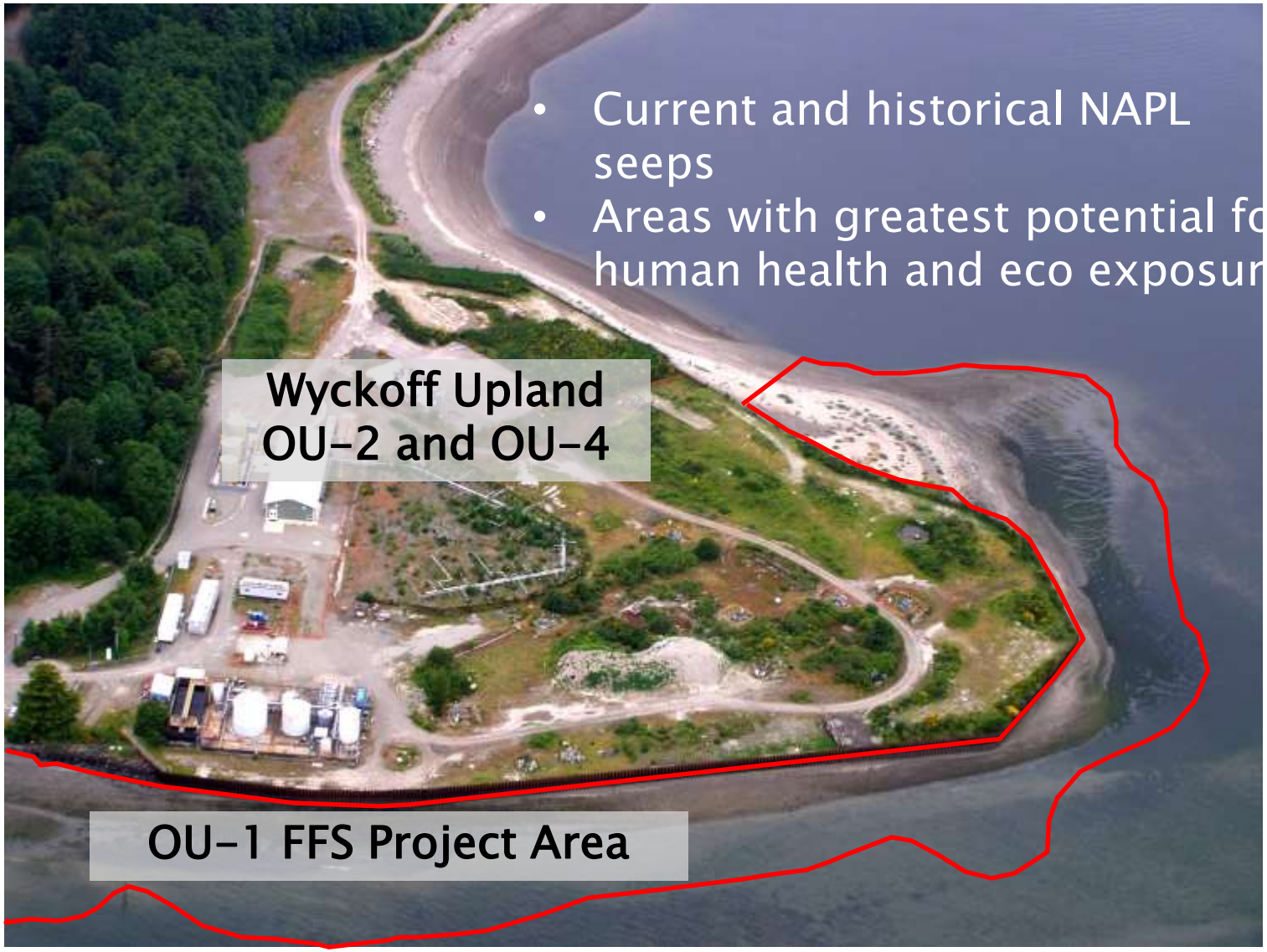
1. No action
2. Containment (the current remedy)
3. Excavation, Thermal Desorption, and In Situ Chemical Oxidation
4. In-Situ Solidification / Stabilization
5. Thermal Enhanced Extraction and ISS
6. Shallow excavation, Thermal Desorption, and Thermal Enhanced Extraction
7. ISS of Core Area, Thermal Enhanced Extraction
8. Maybe new Alternative 7b with larger "Core," NAPL extraction, adaptive management

Common Elements

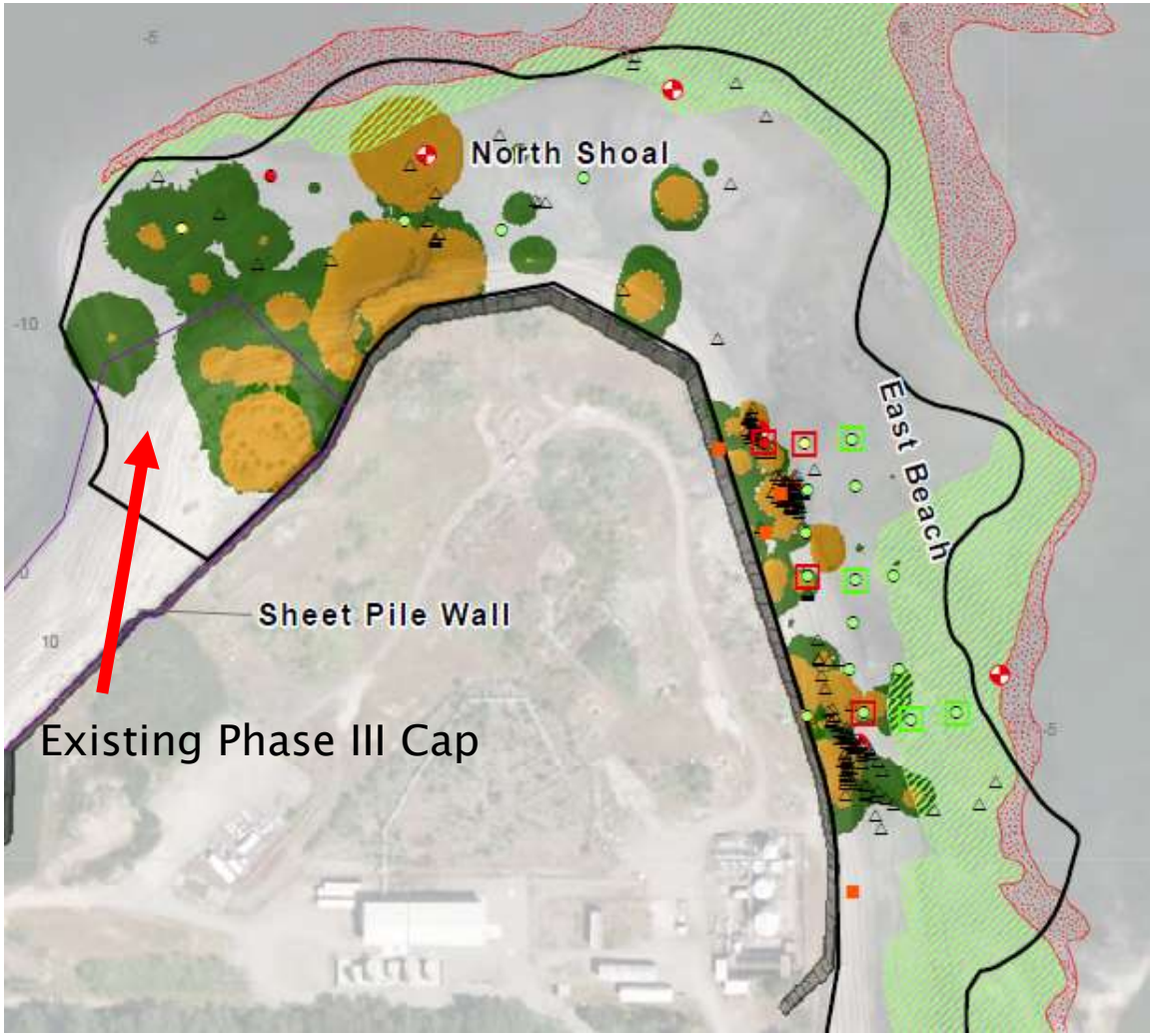
- Mobilizing equipment to the site, permits, health and safety plans
- New Access Road
- Demolition and removal of buried concrete and other debris
- Replacement of sheet pile wall
- Construction of new outfall
- Final site cap
- Costs are not insubstantial:
  - Alternative 4 – $35.1 million
  - Alternative 5 – $51.5 million
  - Alternative 7 – $32.9 million

Status of Beaches Cleanup Alternatives Analysis

OU-1 FFS Project Area



Remedial Target Areas



Active Remedial Technologies for Seeps and Potentially Mobile NAPL Zones (brown areas)

Monitored Natural Recovery (MNR) for Non-Mobile NAPL Zones (dark green areas)

OU-1 FFS Remedial Alternatives

- Alternative 1 – No Action
- Alternative 2 "Seep Patches"
  - Targeted Amended Capping for Seeps and MNR
- Alternative 3 "Low-Profile Inset Caps"
  - Amended Capping and MNR
- Alternative 4 "Contain and Cap"
  - Vertical Containment with Amended (Low-Profile) Inset Capping and MNR
- Alternative 5 "Removal with Thick Caps"
  - Partial Excavation with Amended (Thick) Capping and MNR

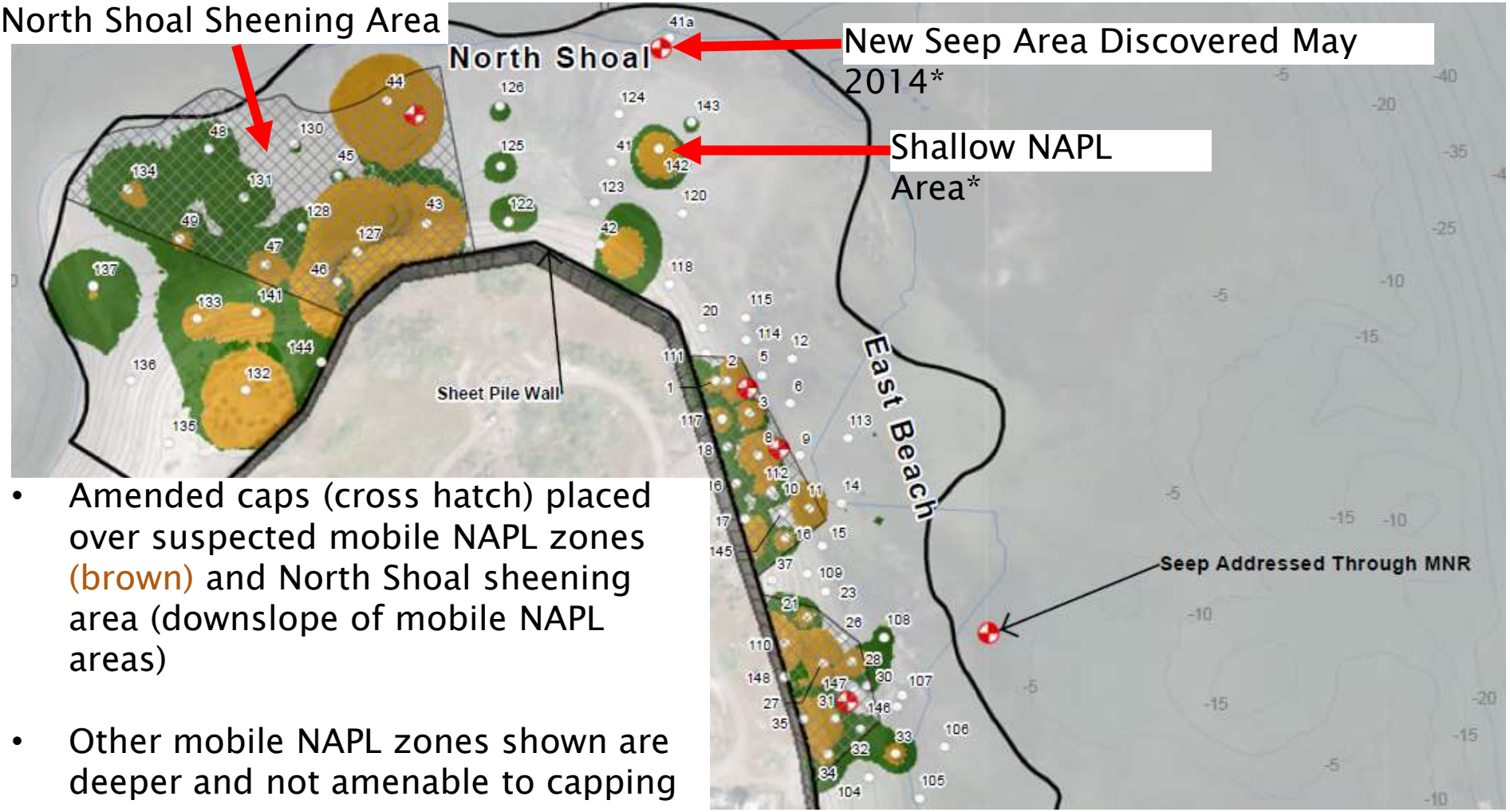
Alternative 3 – "Low Profile Inset Caps"

- AC- and OC-amended caps placed over areas with suspected mobile NAPL and North Shoal Surface Sheen Area
- Excavate, dewater, and inset cap during low tide
  - Approximately 70 40 x 40 foot areas
  - 30-inch AC/OC composite cap profile with 42-inch perimeter skirts
- Dewater, stabilize, landfill or potentially upland dispose of excavated materials
- Long-term O&M
  - 10 percent of cap replaced in each of Years 10, 20, 30, 40, and 50

Area (Acres)	MNR Area (Acres)	Bank Removal Volume (CY)	Disposal Mass (tons)	(Months)
2.5	8.3	10,300	18,000	6

Capital Cost	O&M Cost			Total Cost
	Discounted (7%)	Discounted (1.9%)	Non-Discounted	
$14,509,000	$2,343,000			$16,852,000
$14,509,000		$6,800,000		$21,309,000
$14,509,000			$12,640,000	$27,149,000

Alternative 3 – "Low Profile Inset Caps"



- Amended caps (cross hatch) placed over suspected mobile NAPL zones (brown) and North Shoal sheening area (downslope of mobile NAPL areas)
- Other mobile NAPL zones shown are deeper and not amenable to capping

*To be added to capping area

Alternative 5 – "Removal with Thick Caps"

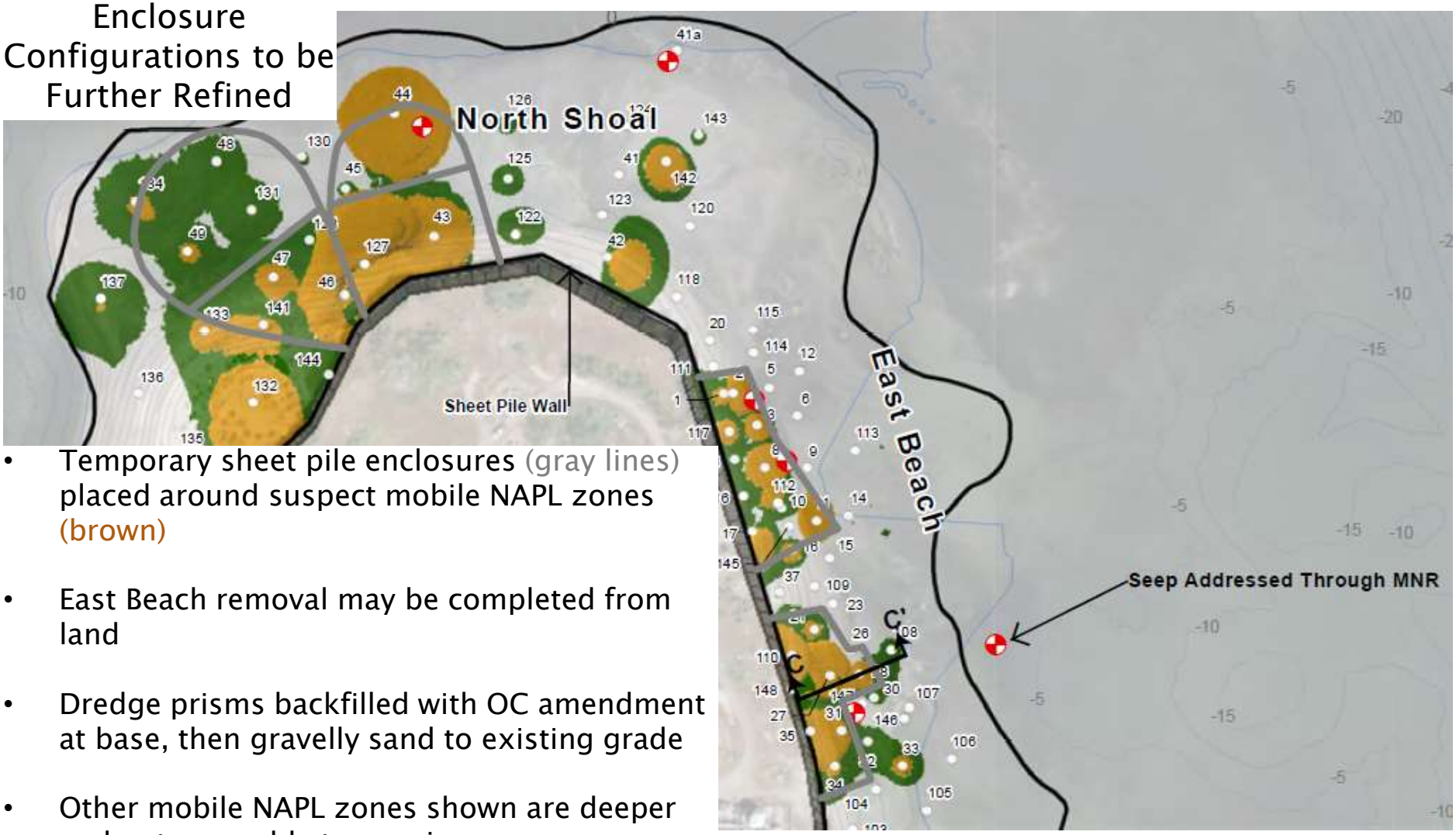
- Temporary sheet pile enclosures to contain dredging
  - Driven to about 25 feet below beach grade
  - Sediments removed to about 10 feet below beach grade
  - Dredges positioned inside enclosure with standing water column
- Backfilled with capping materials
  - OC-amended lift placed at base of dredge prism
  - Gravelly sand backfill placed to beach surface
- Dewater/stabilize, and landfill or potentially upland dispose of dredged materials
- Long-term monitoring but no repair/replacement envisioned

Area (Acres)	MNR Area (Acres)	Bank Removal Volume (CY)	Disposal Mass (tons)	(Months)
2.3	8.5	38,000	63,000	13

Capital Cost	O&M Cost			Total Cost
	Discounted (7%)	Discounted (1.9%)	Non-Discounted	
$42,401,000	$1,146,000			$43,547,000
$42,401,000		$3,269,000		$45,670,000
$42,401,000			$6,645,000	$49,046,000

Alternative 5 – "Removal with Thick Caps"

Enclosure Configurations to be Further Refined

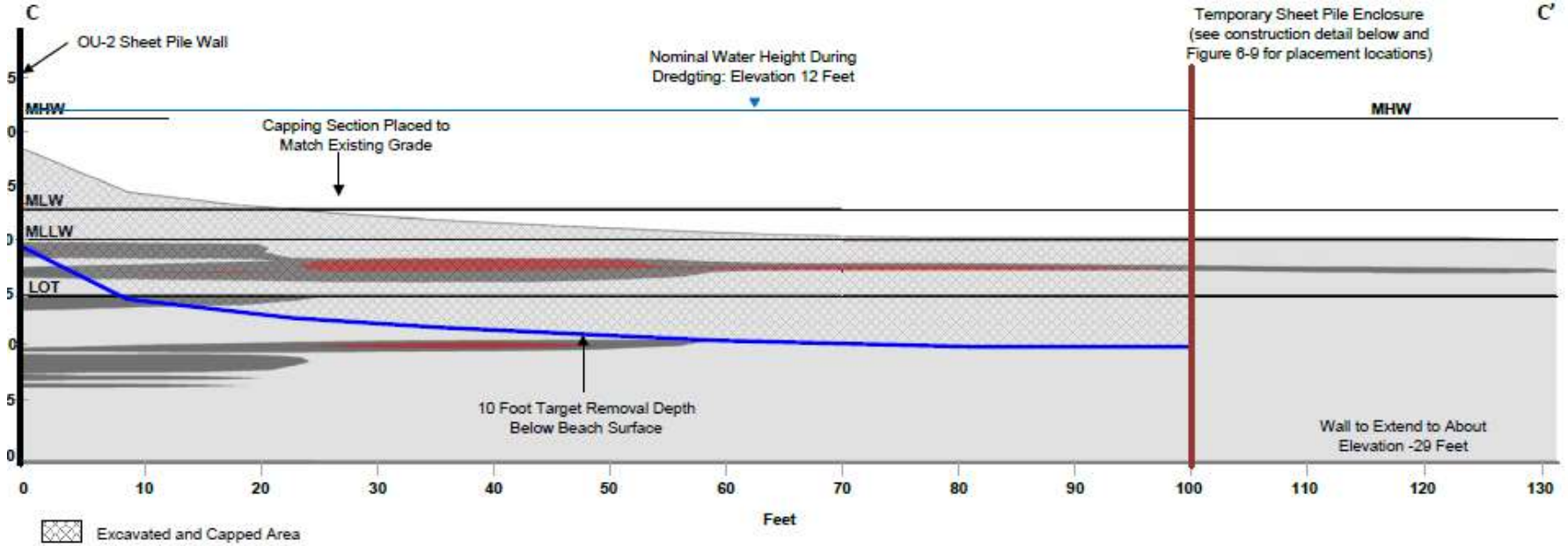


- Temporary sheet pile enclosures (gray lines) placed around suspect mobile NAPL zones (brown)
- East Beach removal may be completed from land
- Dredge prisms backfilled with OC amendment at base, then gravelly sand to existing grade
- Other mobile NAPL zones shown are deeper and not amenable to capping

*To be added to as low-profile inset capping area

Alternative 5 – "Removal with Thick Caps"

Conceptual Cross Section



Excavated and Capped Area

Indicates TarGOST Responses >50% Reference Emitter (RE) Indicative of Potential Mobile NAPL

Indicates 50% or Greater Chance of Encountering NAPL Based on TarGOST responses >10% Reference Emitter (RE).

MHW – Mean High Water
MLW – Mean Low Water
MLLW – Mean Lower Low Water
LOT – Lowest Observed Tide

Vertical Elevations are in Feet (MLLW)

Typical Range of Tidal Elevations Expected During Dredging are MHW (10.5 feet) to MLW (2.8 feet).
Cap to Consist of Gravelly Sand over 6-Inch Layer OC-Amended Sand.
Cap Placed Over 6-Inch Sand Layer for Settling Dredging Residuals.

Note: Drawing is for conceptual illustration only.

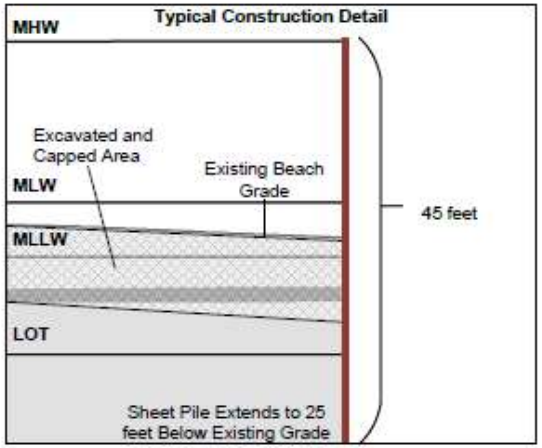


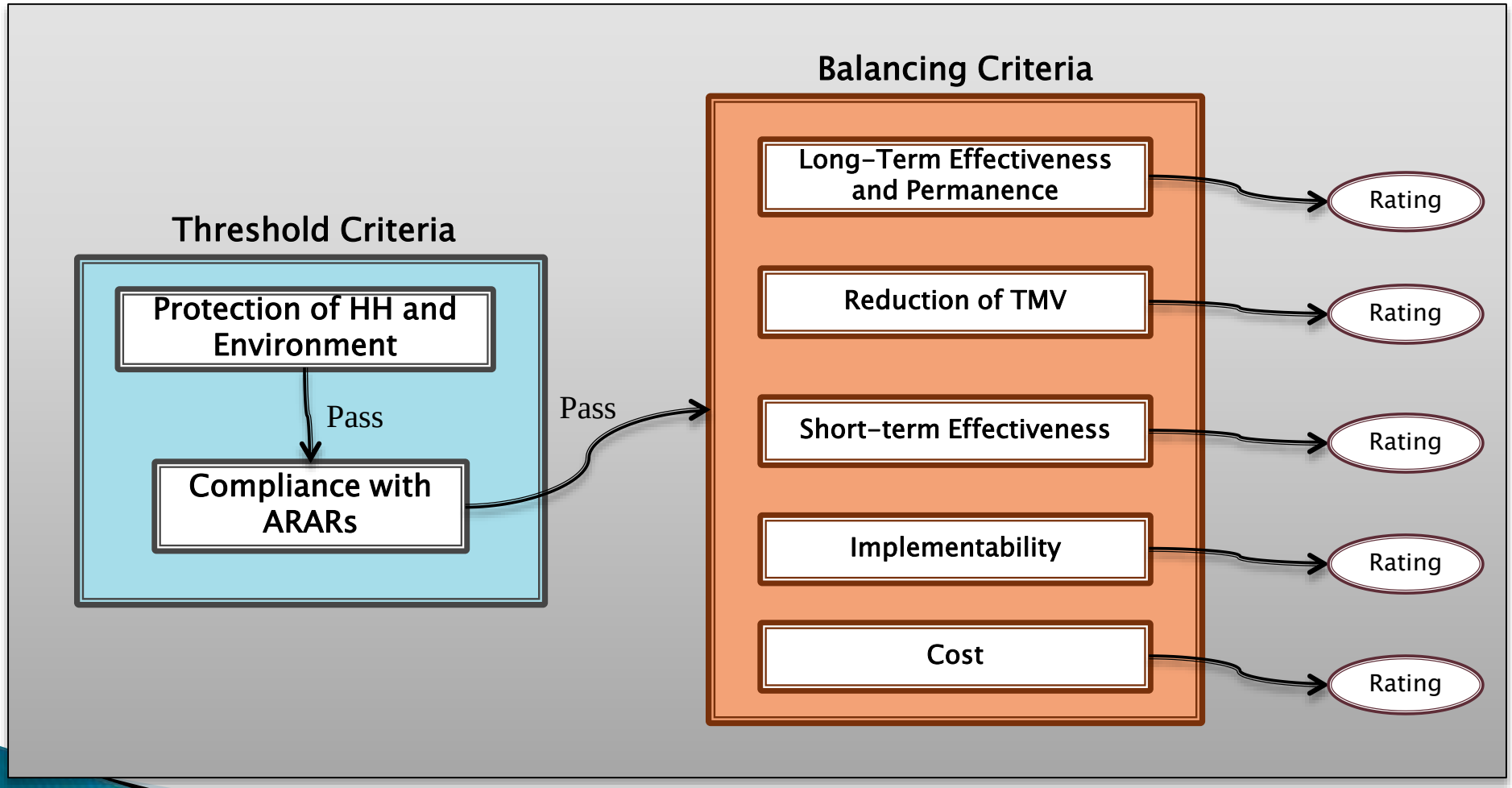
Figure 6-10
Alternative 5 Cross Section C-C': Partial Excavation and Amended (Thick) Capping and MNR
Wyckoff OU-1 Focused Feasibility Study

EPA

OU-1 FFS Remedial Alternatives

- Alternative 1 – No Action
- Alternative 2 "Seep Patches"
  - Targeted Amended Capping for Seeps and MNR
- Alternative 3 "Low-Profile Inset Caps" $16.8 million
  - Amended Capping and MNR
- Alternative 4 "Contain and Cap"
  - Vertical Containment with Amended (Low-Profile) Inset Capping and MNR
- Alternative 5 "Removal with Thick Caps" $43.5 million
  - Partial Excavation with Amended (Thick) Capping and MNR
- Possible New Alternative 6 (?) – hybrid between 3 and 5

CERCLA 9 Criteria



Detailed Analysis of Alternatives Approach

- Threshold criteria evaluated using:
  - Pass (yes)
  - Fail (no)
- Alternatives that failed threshold criteria not carried forward for balancing criteria evaluation
- Balancing criteria evaluated:
  - Narratively
  - Rating provided using the following:

 = Expected to perform very well against the criterion with minimal disadvantages or uncertainties

 = Expected to perform moderately well against the criterion but with some disadvantages or uncertainties

 = Expected to perform less well against the criterion with more disadvantages or uncertainty

Phasing and Coordination of OU-1 and Upland (OU-2 and OU-4) Remediation

- *Limited Upland Work Area!*
  - Limited storage area
  - Limited access to/from upland once OU-2 and OU-4 remedy begins
  - Limited or no GWTP capability once OU-2 and OU-4 remedy begins
- Sheet Pile Wall Upgrade
  - Ideally complete before OU-1 remedy to isolate potential remaining contaminant sources and prevent interference
- Sequence: Complete OU-1 Remedy First, then OU-2 and OU-4
  - Optimizes available upland laydown and stockpile storage
  - Can use GWTP for dewatering water processing
  - Could need extended storage of dredged/excavated materials if upland disposal is feasible
- Will develop recommended sequence, duration estimates for Proposed Plan

Barrier wall: Inside or outside?

- Barrier wall will fail within 100 years
- Will be replaced as part of Upland cleanup
- Current plan: replacement inside the existing steel sheetpile wall
- *Possible* new plan: replace on the outside

Rip rap and other debris buried next to wall

If we replace the wall on the outside (Water side)

Pros

- Won't have to remove debris, saves $8 – $11 million
- Less uncertainty for cost, schedule, implementation
- Could design more aesthetically pleasing outer wall

Cons

- Would permanently fill intertidal habitat
- Would require mitigation

Next steps for both Upland and Beaches

- EPA Remedy Review Board January 2015
- Proposed Plan and FFS documents available for public review and Summer 2015
  - Notice in newspaper
  - Formal public meeting(s)
  - Opportunity for verbal and written comment
- Record of Decision Winter 2015